FUNCTIONAL FENESTRATION INC.

Home Automation Systems
## Installation Guide for FFI Actuator & Control Projects

This installation guide is for home automation systems such as Crestron, Lutron and others which communicate with FFI controllers and actuators. Accessory adapters/translators may be necessary, depending on the system.

System Layout
It is important to look at the diagrams of your system layout from FFI and understand how the components are to be connected together. Control panels must be placed in the correct locations of the building to operate as planned.

There are 3 ways for FFI controllers to interface with home automation systems: by dry contact, by RS-232 protocol, and by RS-422 protocol.

Example: Home Automation System layout diagram. For reference only – not project specific.
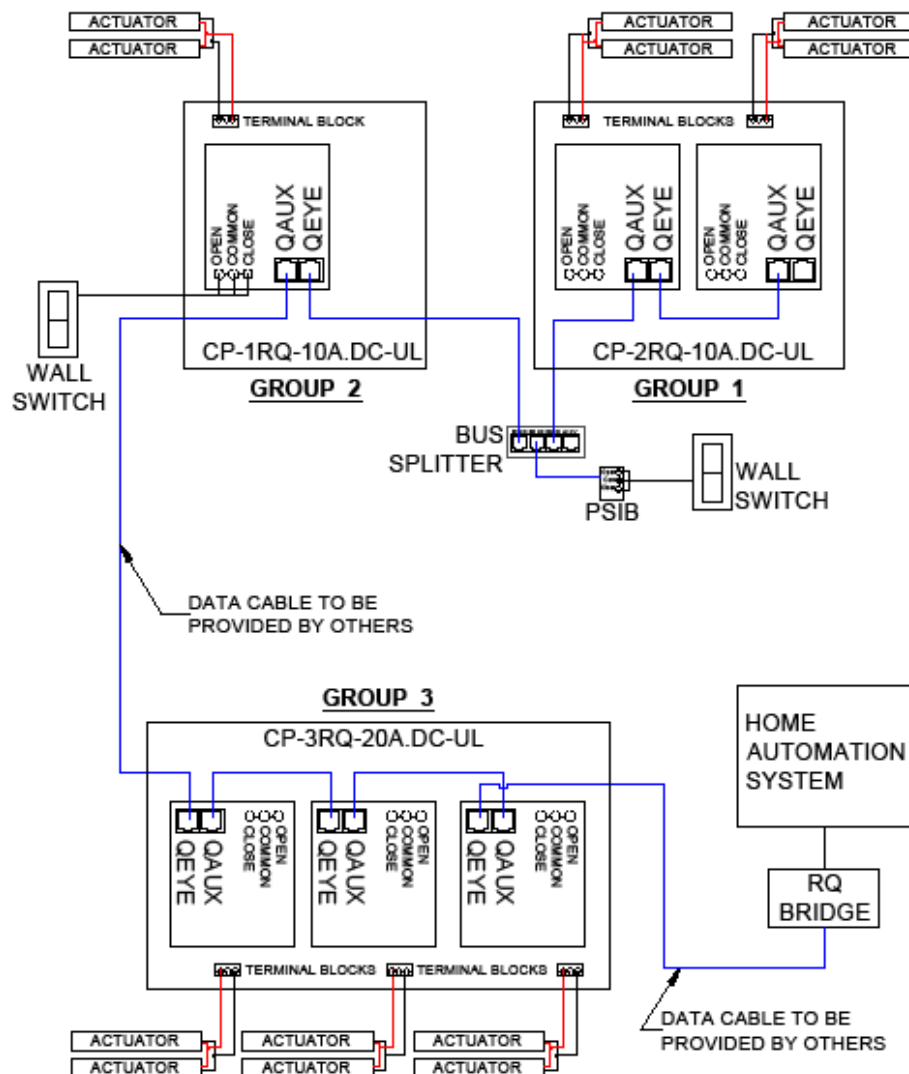

PSIB accessory can be used in many instances, it is used more often when there are 2 or more RQ's.
Diagram elements are not to scale.

System Connections

Cable Routing Recommendations:

- Always keep data cable at least 18 inches away from an AC power line.
- If it is necessary to cross AC power, do so at a 90 degree angle to reduce electrical interference.
- Do <u>not</u> run data cabling with power lines inside conduit.
- Do <u>not</u> bend data wire any tighter than 4 times the diameter of the cable; any more will risk breaking conductors inside the jacket.
- Run data cable "High and Tight" by keeping cables away from other objects and securing them when possible.

FFI Control Panel containing a power supply and controllers
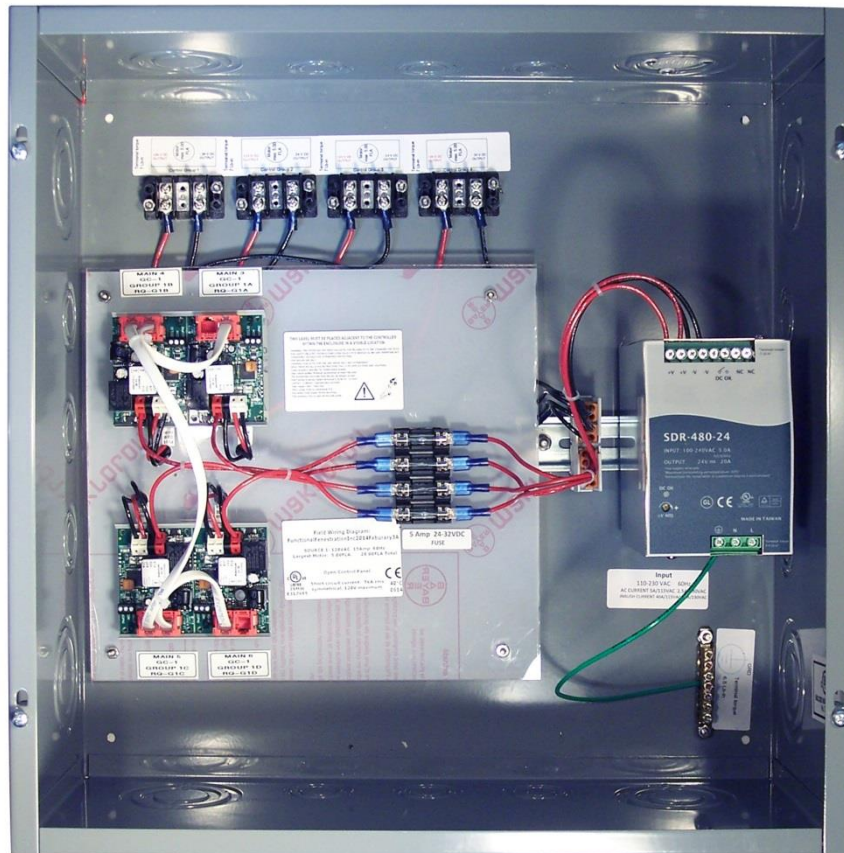
🚫 **<u>Do not add non-essential components or disconnect internal wires or components!</u>**

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Data Connections

Data Cable Selection

- **CAT5/5e** cable is best for long runs. CAT6 cable is <u>not</u> recommended.
- **RJ-25 (6P6C) modular connectors are required** for FFI control panels.
- **Always test your data cables.**
- Before installing, also read the *FFI Cables Data Sheet* for important instructions.
- Do not add non-essential components or disconnect internal wires or components!

CAT5/5e cable

RJ-25 modular connector

Data Ports

Controllers have a QAUX port and a QEYE port as shown below. Multiple controllers and control panels can be connected by EYE to AUX ports, or by AUX to AUX ports, but <u>never</u> by EYE to EYE ports. This applies to other FFI components as well such as bridges.
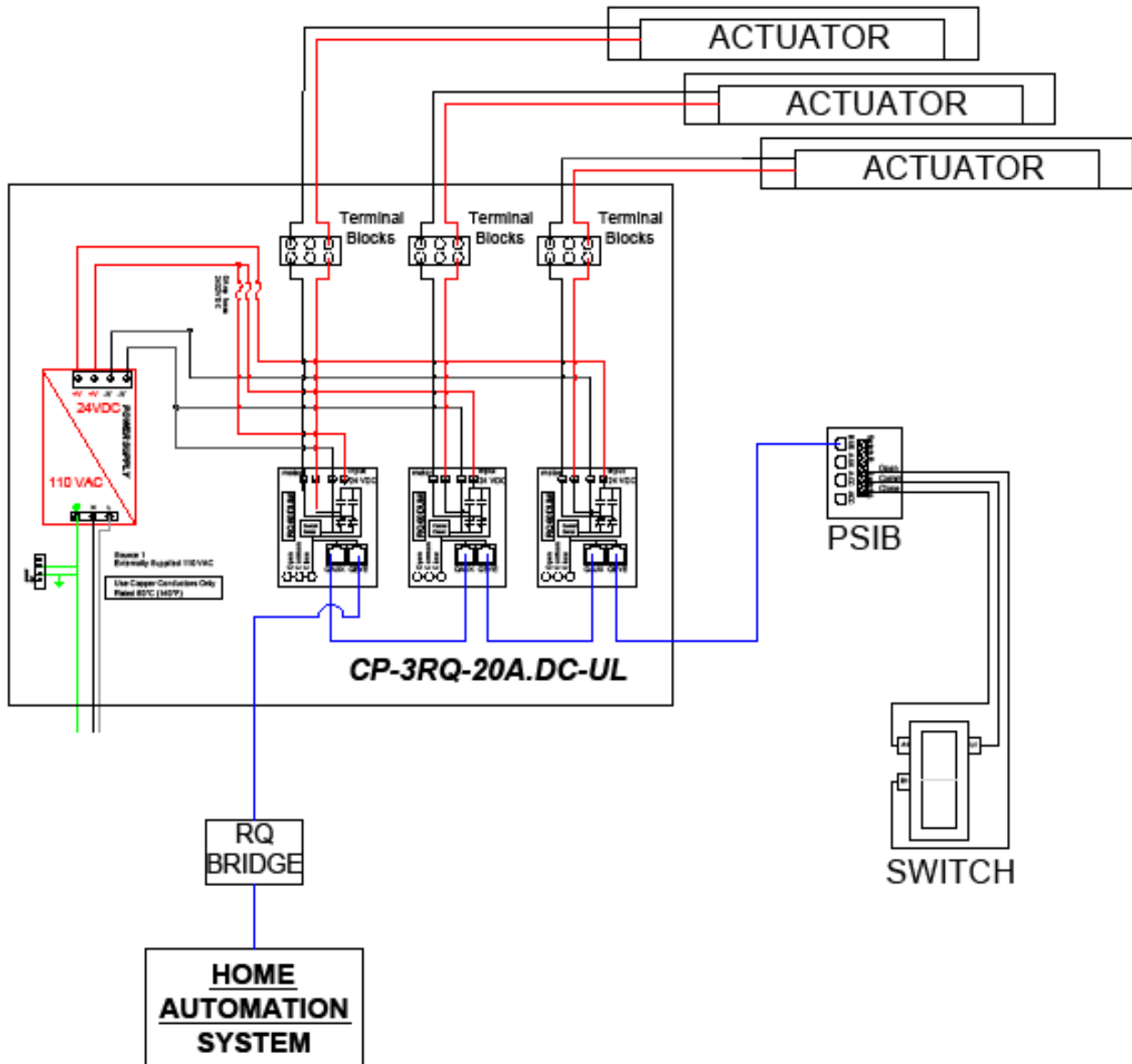
RQ controller orientation in the control panel may vary, so please pay close attention to each RQ controller to be certain you are connecting to the correct ports. See "RQ Controller Connections" page for more information.

QAUX QEYE
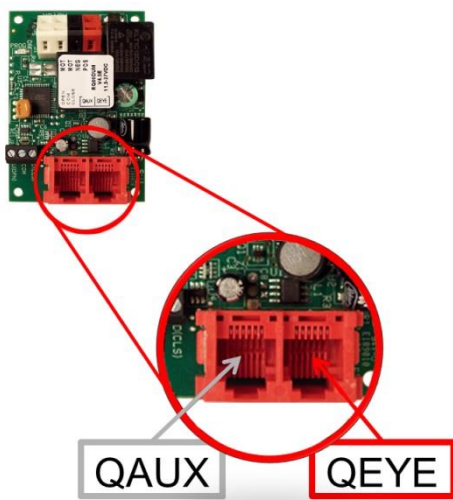
Controllers connected by EYE to AUX ports and AUX to AUX ports
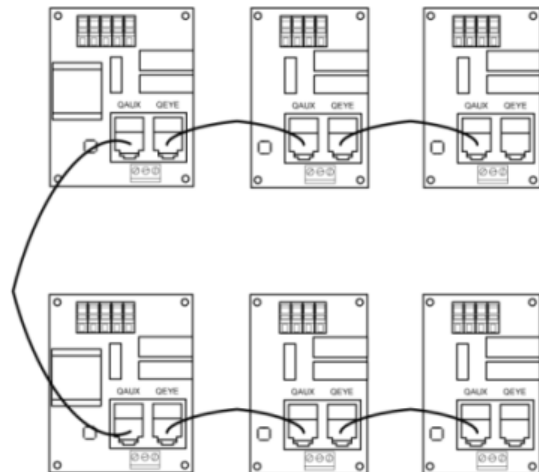
**System Example: Three DC actuators with FFI Control Panel, PSIB, momentary contact switch, and connection to Home Automation System.
For reference only – not project specific.**

PSIB accessory can be used in many instances, it is used more often when there are 2 or more RQ's.
Diagram elements are not to scale.

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System Example: DC actuators with FFI Control Panels, dry contact switch, and connection to Home Automation System.
For reference only – not project specific.

NOTES:

① WALL SWITCH UTILIZES A DRY CONTACT CONNECTION
   TO THE RQ60DUM CONTROLLER.

② KEYPAD UTILIZES A DATA CABLE CONNECTION VIA QEYE PORT AND IS
   USED TO INITIALIZE THE TO RQ60DUM CONTROLLERS AND ACTUATORS.

③ HOME MANAGEMENT SYSTEM CONNECTS TO RQ-BRIDGE TO SEND
   AND RECEIVE DATA TO AND FROM THE RQ60DUM CONTROLLERS.
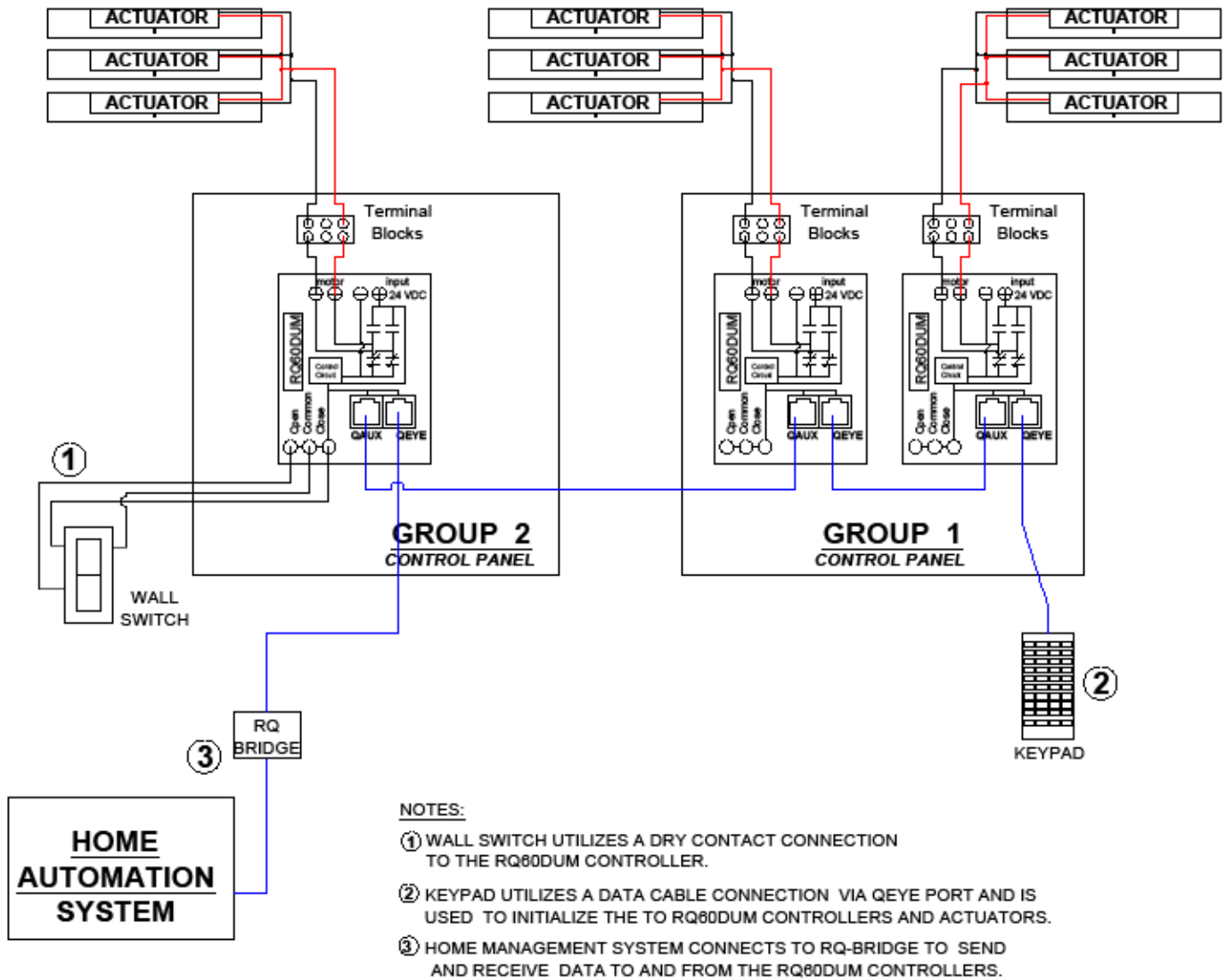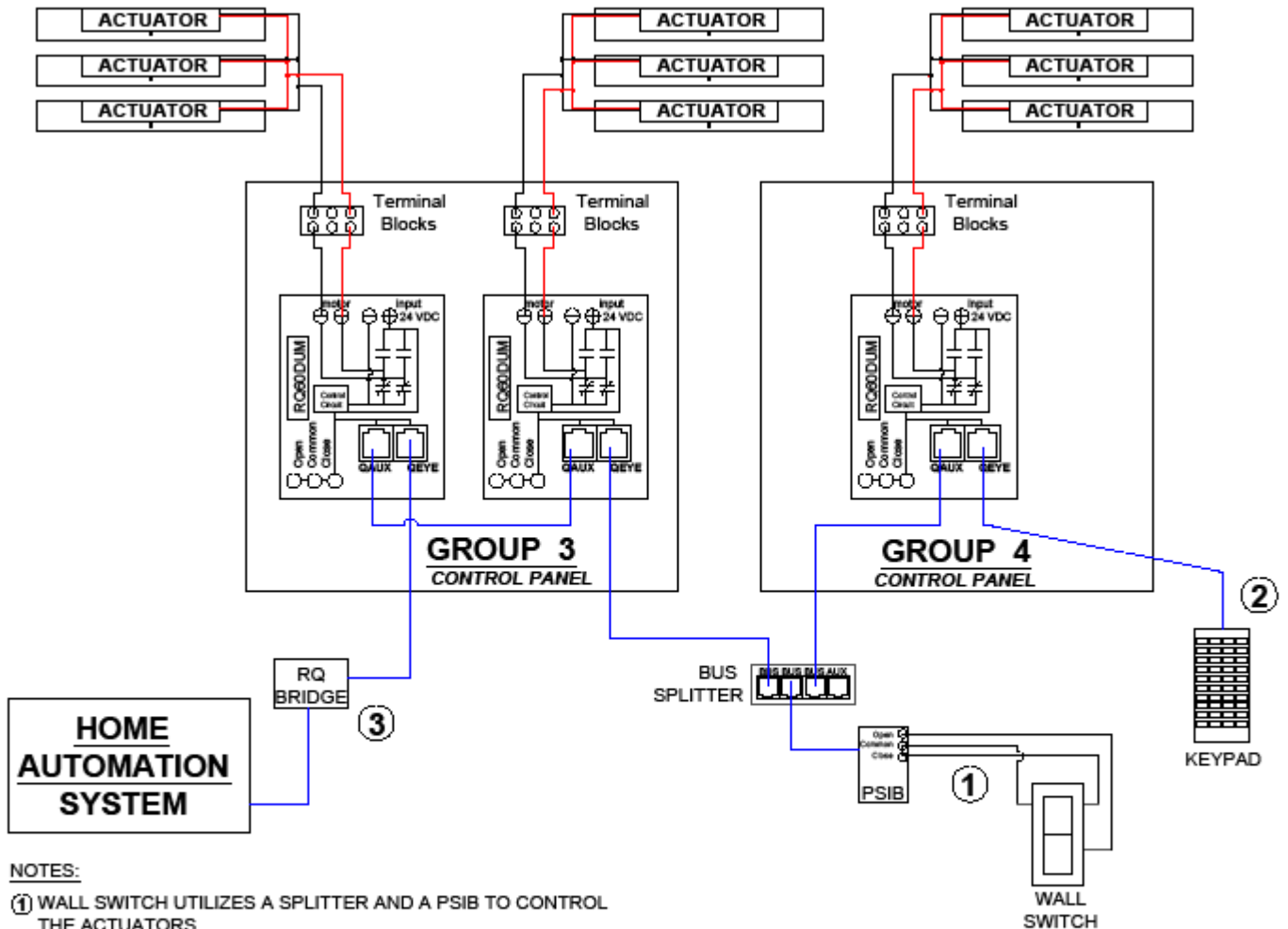
Diagram elements are not to scale.

System Example: DC actuators with FFI Control Panels, a wall-switch with PSIB and bus splitter, and connection to Home Automation system.
For reference only – not project specific.

NOTES:

① WALL SWITCH UTILIZES A SPLITTER AND A PSIB TO CONTROL THE ACTUATORS.

② KEYPAD UTILIZES A DATA CABLE CONNECTION VIA QEYE PORT AND IS USED TO INITIALIZE THE TO RQ60DUM CONTROLLERS AND ACTUATORS.

③ HOME MANAGEMENT SYSTEM CONNECTS TO RQ-BRIDGE TO SEND AND RECEIVE DATA TO AND FROM THE RQ60DUM CONTROLLERS.
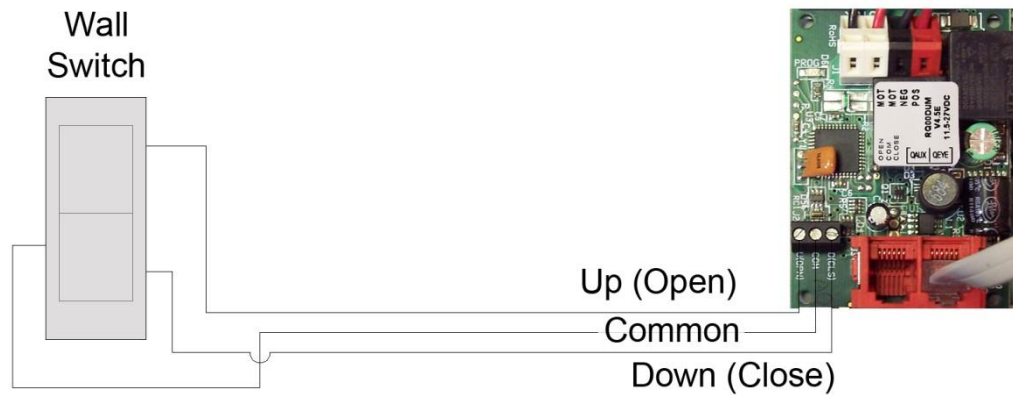
PSIB accessory can be used in many instances, it is used more often when there are 2 or more RQ's.
Diagram elements are not to scale.

Home Automation Systems – Dry Contact

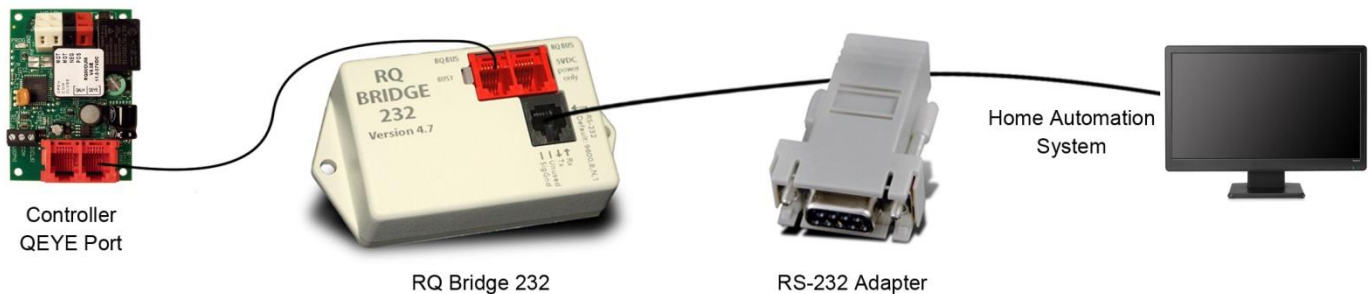## Momentary: Single Pole Double Throw (SPDT)

Warning! *Do not apply voltage to the dry contact inputs.*

SPDT switch connection to a controller


Home Automation Systems – RS-232 protocol

RS-232 requires a bridge and RS-232 adapter to connect controller with home automation systems.

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Home Automation Systems – RS-422 protocol

RS-422 requires a bridge to connect with home automation systems.

The RS-422 Data BUS is capable of a combined length of 3200 feet in four networks. This is an electrical limit and cannot be exceeded on a single network. For more information contact FFI.

Controller QEYE Port — RQ Bridge 422 — Home Automation System
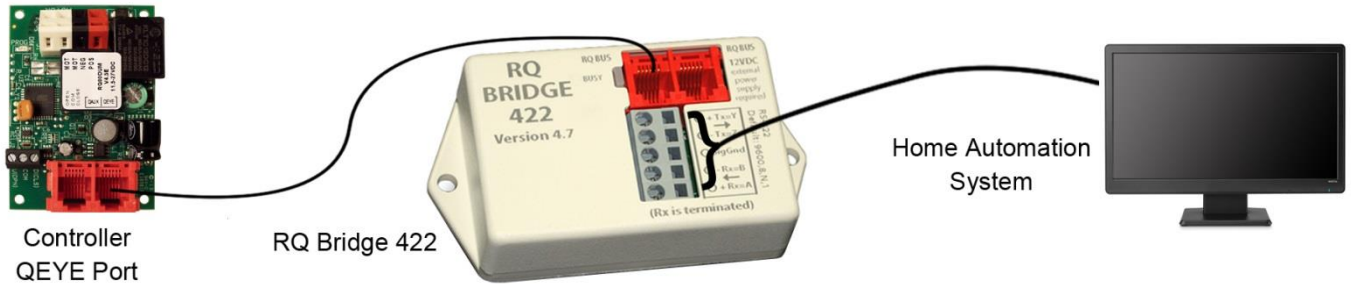
Optional Components – for FFI actuator & control systems

PSIB – Programmable Switch Interface in a Box

Can be used to connect a group of FFI Actuators to a local switch and bypass a central BUS command. Allows fewer wire runs, with decentralized control.

Bus Splitters – To add or make connections to the data bus.
Mounted in plastic enclosures.

aSP2E2QB - for 2 Eyes and
up to 2 RQ Motor Controls

SP1E3QB - for 1 Eye and
up to 3 RQ Motor Controls

SP2E2Q- for 2 Eyes and
up to 2 RQ Motor Controls

SP1E3Q - for 1 Eye and
up to 3 RQ Motor Controls

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Actuator and Power Connection to the FFI Control Panel

🚫 **Do not add non-essential components or disconnect internal wires or components!**

The FFI Control Panel has knock-outs on all sides for easy access to connect actuators and power.

Actuator connection
- Connect to the terminal strip provided inside the FFI Control Panel.
- Connect positive wire to positive terminal, and negative wire to negative terminal.

For actuator wire colors and details, see the Installation Guide for your actuator model.

Power connection
- Connect to the internal power supply, 110 VAC from external source.
- Connect Black (hot) wire to L.
- Connect White (neutral) wire to N.

FFI Control Panel
For reference only – not project specific. Contact FFI for details and options.
RQ controller orientation in panel may vary; for more on this, see "RQ Controller Connections" page.
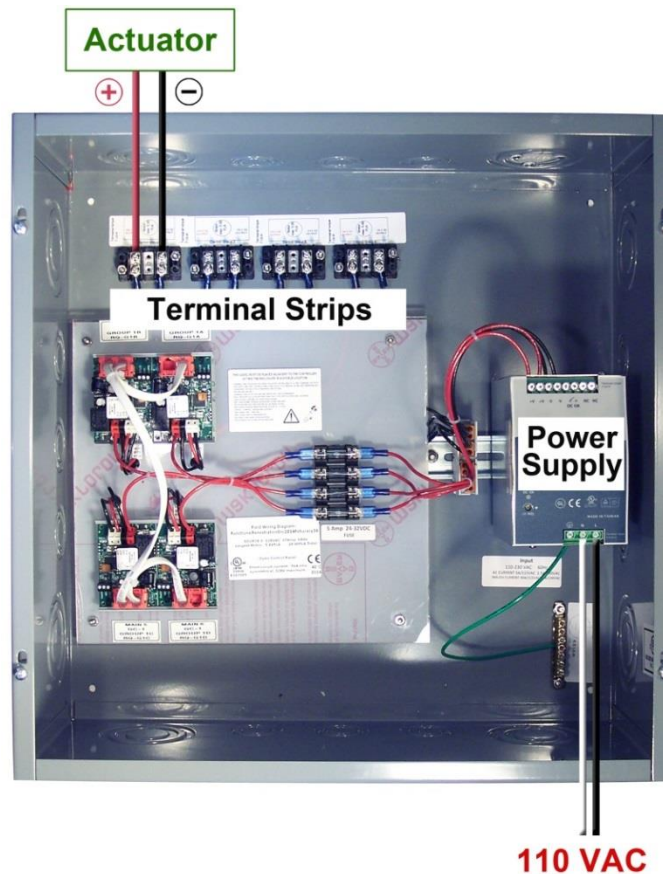
RQ Controller Connections

The white label on top of the RQ controller card shows where all of the connections are located on the RQ controller. The white label shows where to find the connections for the following:

- The QAUX and QEYE ports.

- The dry contacts for OPEN, COMMON, and CLOSE.

- The Actuator connections (MOT) and Power connections (NEG and POS).
  Note: Do not tamper with these, as they are pre-wired for every Control Panel.

Important: The label may be in any of four orientations as you look at it. The orientation can change depending on the design of the Control Panel containing the RQ controllers. Please pay close attention to each RQ controller to be certain you are connecting to the correct contacts.

The QAUX and QEYE ports are particularly important to connect correctly, as it can be easy to confuse the two. Below are examples to illustrate this.

The white label may have different orientations as you look at different RQ controllers, as shown below.

The white label indicates the location of the connections on the particular RQ controller, as shown below. Connect only at orange arrow points; do not tamper with other wiring or components.
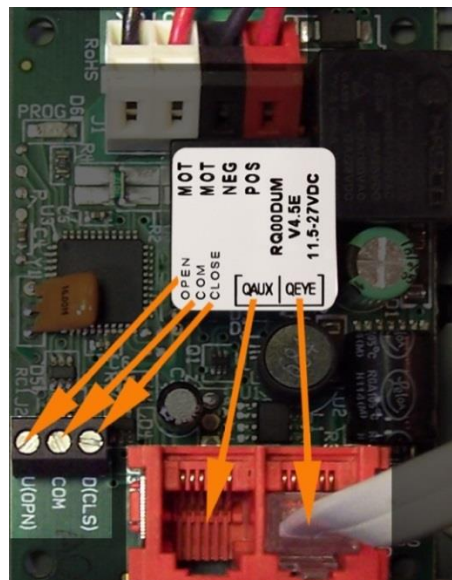
Initializing the system using keypad or PC program

Initialization tells the controllers the amount of time it takes for the actuators to fully open and close.
Please note if you have a custom keypad overlay, please contact FFI to confirm these instructions.

Initialize using FFI Keypad, part # K24ST

1. Connect the FFI Keypad to the control panel at the end of the string of connected controllers (see Fig. A). Connect using a JP12 cable (part# JP12) into a QEYE port (see Fig. B). First unplug any cable currently in that port. The keypad indicator light will blink a few times to show it is powered.

Fig. A

Fig. B
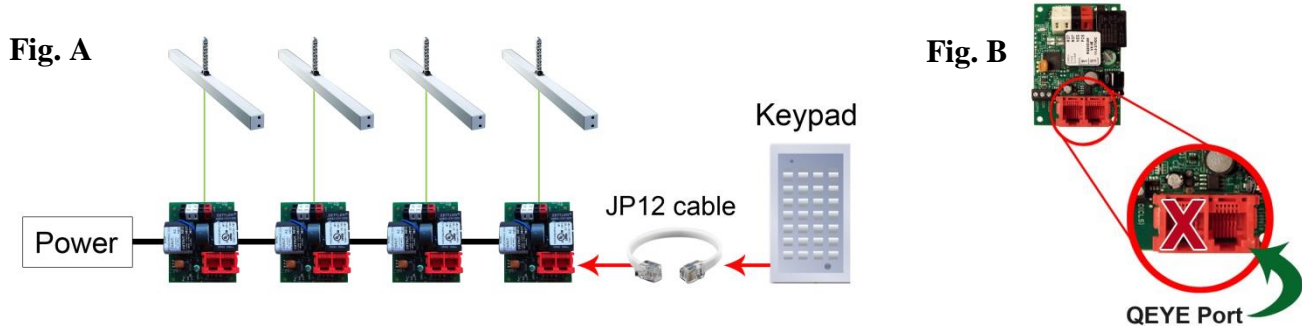
2. Enter the following into the FFI Keypad as shown in the steps below. Each step must be entered within approx. 3 seconds of the previous step, or the command sequence will stop.

Step **1**: **Press and hold together: 7** and **19** and **STOP** (also known as OPEN 7, CLOSE 7, STOP.)	Step **2**: When red LED light begins to flash, **Press OPEN (ALL)**
Step **3**: **Press 22** (also known as CLOSE 10.)	Step **4**: **Press 10** (also known as OPEN 10.)

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3. The actuators will all open, close, then finish in the open position. This will take a few minutes.

4. To close the actuators and windows, press the CLOSE (ALL) button.

5. To re-test opening and closing all of the actuators in the string of controllers, use the steps below.
   If all of the actuators in the string open and close at the same time, then initialization is complete.

Step 1: Press OPEN (ALL)	Step 2: Press CLOSE (ALL)
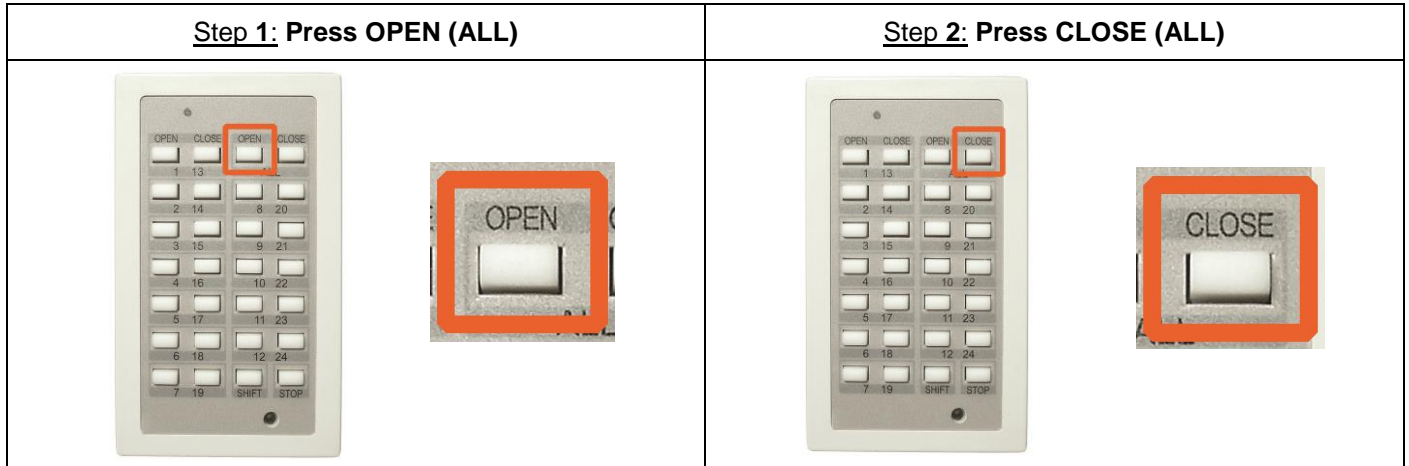
6. Finally, disconnect the JP12 cable from the control panel, and initialization is done.

7. If the actuators do not all open and close at the same time:

   a) Repeat at least 2 more times entering the commands into the FFI Keypad.
   b) Check that the cable from the keypad is connected to the correct port on the correct controller card.
   c) Check that all cables are plugged in securely, and to appropriate QEYE or QAUX ports.
   d) If these do not work, see Troubleshooting section.

Initializing using a PC with Terminal Emulator program (optional, instead of keypad)

Terminal Emulator software can give commands and perform system inquiries as well as perform Initialization. For more information, contact FFI.

Troubleshooting

Questions? Troubleshooting? Call FFI at 800-677-0228. But first –

(1) **Always test your data cables.**
Use a cable tester to check all cables connected to the card
and control panel. For more details, see FFI Cables Data Sheet.

(2) **Test for Power.**
Check that the controller card is getting power. The controller card
has a green LED that lights up briefly when it receives a command;
if it is lighting up, then it is getting power. This can be checked by
connecting a keypad to the QEYE port and pressing the STOP button.

Green LED Light

(3) **Test for Continuity with a multi-meter.**
Use a multi-meter to check the continuity between the
power supply and the terminal block(s). As shown on diagram
to the right, touch the multi-meter to the screw-heads on the
power supply and each terminal block in the control panel
as indicated by the orange arrows. Test between these
negative connections, then positive connections.
Do not disconnect any internal wiring.
If you do find a continuity problem, next test the fuse
by probing at each end of the fuse.
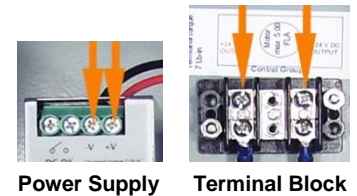
Power Supply   **Terminal Block**

Fuse

(4) 🚫 **Do not add non-essential components or
disconnect internal wires or components!**

(5) **Check system status using a
PC Terminal Emulator program.**
For more information, contact FFI.

(6) If all of the actuators are working together to a certain point
in the string, and beyond that point no actuators are working,
then the first non-operational actuator indicates which controller
card is experiencing a problem. Check that card to look for the problem.

(7) **The FFI Field Power Switch** is available for use with
FFI DC actuators, for testing and installation.

**FFI Field
Power Switch
Part #
SW.FPS.01**

(8) Contact FFI for assistance.

Recommendations for FFI Actuators & Controls: FFI only recommends UL compliant systems. FFI is a UL Registered firm.
Read FFI data sheets & installation guides before specifying project details. Project-specific needs vary depending on the
number of actuators, electrical layouts, building management systems, distance between power supplies & actuators, and
other details. Project specifications to comply with electric & building codes—for wire gauge, wire connections and run
distance, conduits, junction boxes—must be arranged by the project electrical contractors.
**Distribute this guide to all project parties, including electric contractors, architects and building management
personnel!**